

San José State University
Computer Science Department
CS 47, Introduction to Computer Systems, Section 2, Spring, 2017

Course and Contact Information

Instructor:	Charles Bocage
Office Location:	MacQuarrie Hall, Room 422
Email:	Charles.Bocage@sjsu.edu
Office Hours:	MW 7:30 pm – 8:45 pm (also by reservation)
Class Days/Time:	MW 6:00 pm – 7:15 pm
Classroom:	MacQuarrie Hall, Room 422
Prerequisites:	CS 46B (Introduction to Data Structures) with a grade of C- or better, or instructor's consent. The Department of Computer Science strictly enforces prerequisites. The instructor may drop any student who does not show up for the first two class meetings without providing a valid excuse ahead of time.

Course Format

This course uses hybrid style. In general students are expected to have computer systems with internet connection. A tool 'MARS' will be used to study assembly programming concept. The materials are uploaded in Canvas prior to class. Students are encouraged to review the lecture note before coming to class. During class hour it is expected that students bring their laptop with internet connection to download some program material to work on during class hour if needed. All the homework and assignments are to be uploaded in Canvas.

Course Description

Instruction sets, assembly language and assemblers, linkers and loaders, data representation and manipulation, interrupts, pointers, function calls, argument passing, and basic gate-level digital logic design.

Course Topics:

Computer organization, Number representation, programming a computer, assemblers, linker, loader, MIPS assembly language programming, run time memory stack, interrupt & exceptions, Boolean algebra, integer mathematics, logic gates & logic design.

Course Objectives:

- To get introduced to the organization of a computer system
- To get familiarized with instruction sets and assembly programming
- To experience extensive programming practice that reinforces binary data representation, assembly instructions, addressing modes, and run time stack organization
- To get extensive lab practice using computer simulation
- To appreciate how the computer hardware supports systems programming and high-level languages

Learning Outcomes and Course Goals

Course Goals:

The course consists of an introduction to computer hardware organization and the hardware/software interface. Programming assignments are used to reinforce concepts of data representation, addressing modes, memory organization, run time stacks, and interfacing with high-level languages.

Course Learning Outcomes (CLO):

Upon successful completion of this course, students should be able to:

- To be familiar with the architectural components of a computer system: CPU (registers, ALU), memory and buses
- To be able to convert between decimal, binary, and hexadecimal notations
- To work with two's complement integers, floating-point numbers, and character encodings
- To be able to write assembly programs that use load/store, arithmetic, logic, branches, call/return and push/pop instructions
- To understand the gate-level operations of basic ALU

BS in Computer Science Program Outcomes Supported:

These are the BSCS Program Outcomes supported by this course:

- a) An ability to apply knowledge of computing and mathematics to solve problems.
- b) An ability to analyze a problem, to identify and define the computing requirements appropriate to its solution
- c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- i) An ability to use current techniques, skills, and tools necessary for computing practice
- j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices

Required Texts/Readings

Textbook

COMPUTER ORGANIZATION and DESIGN | Edition: 5

Author: DAVID A. PATTERSON

ISBN: 9780124077263

Publication Date: 10/10/2013

Publisher: ELSEVIER

Other Readings

LOGIC & COMPUTER DESIGN FUNDAMENTALS | Edition: 5

Author: MANO & KIME

ISBN: 9780133760637

Publication Date: 03/04/2015

Publisher: PEARSON

Other technology requirements / equipment / material

You will be **required** to bring a [wireless laptop](#) to all classes.

Course Requirements and Assignments

- Each student is expected to be present, punctual, and prepared at every scheduled class and lab session. It is assumed that the students already have basic knowledge of digital Boolean logic and fundamentals of assembly language machine programming.
- Attendance is **NOT** optional. Individual participation is also required. There will be no make-ups for missed midterm or assignments, unless any special arrangements is made with the instructor beforehand.
- There will be **2 home works, 8 programming assignments, 1 individual project, one midterm and final exam**. All home works, programming assignments and projects should be submitted through Canvas. **No scanned copy** of handwritten solution is allowed. Allowed document type is **PDF** only.

Project report should contain the following.

- Introduction containing objective.
- Requirement.
- Design and Implementation.
- Testing
- Conclusion
- Make sure to
 1. Include clear diagrams for requirement and design.
 2. Include code snippet to explain implementation.
 3. Include screen shots of testing results.
 4. Upload source code and test program as zip archive.

Project reports are encouraged to be submitted in [IEEE format](#).

10% of the obtained marks in project will be awarded as extra points in project evaluation if report submitted in proper IEEE format.

Final Examination or Evaluation

There shall be an appropriate final examination and evaluation at the scheduled time as indicated in University calendar, unless specifically exempted by the college dean who has curricular responsibility of the course. The examination is expected to have descriptive, problem analysis and problem solving style questions to answer. More details can be found in [University Policy S06-4](http://www.sjsu.edu/senate/docs/S06-4.pdf) (<http://www.sjsu.edu/senate/docs/S06-4.pdf>) which states that “*There shall be an appropriate final examination or evaluation at the scheduled time in every course, unless specifically exempted by the college dean who has curricular responsibility for the course.*”

Grading Information

1. Homework carries **20%** towards final score. Average of 2 score from homework will be contributed.
2. Programming assignment carries **10%** towards final score. Average of 8 scores from programming assignments will be contributed.
3. Project carries **20%** towards final score.
4. Midterm carries **20%** towards final score.
5. Final carries **30%** towards final score.

Submission is allowed till 11:59 pm on due date. Zero delay tolerance for the submission, i.e. NO late submission is permitted, unless you make special arrangements with your instructor beforehand.

You will receive a numeric score for the midterm, the final, each of the total homework, and each project submission. Letter grade, which is your class grade, will be obtained by adding the numeric scores and weighing with the percentages given below. Fraction in percentage will be converted into nearest integer value ('>= 0.5' will be moved to next integer number, '< 0.5' will be moved to previous integer number).

Determination of Grades

At least	Letter Grade
100%	A+
93%	A
90%	A-
87%	B+
83%	B
80%	B-
77%	C+
72%	C
70%	C-
67%	D+
62%	D
60%	D-
<60%	F

Classroom Protocol

1. **You must come to class on time!** Students entering the classroom late disrupt the lecture and / or the students already in class who may be engaged in lab or discussion. Late students will may be accepted in class.
2. If you miss a lecture you are still responsible for any material discussed or assignments given. A large portion of each class will be used for hands-on lab / discussion. All students are expected to participate in class activities. Students who are often absent will find themselves at a disadvantage during the tests.
3. No audio / video recording or photography in the classroom without prior permission of instructor.
4. It is individual **student responsibility to check validity** of their homework, assignment, project, submission (format error, blank files, corrupted files, and many more such) and re-submit within deadline if needed. Once the grading is started there will be no consideration for resubmit. ***If the submission found to have any logistics issue at grading time (format error, blank files, corrupted files, and many more such) it will be evaluated as 0.***
5. No personal discussion or cell phone activity during class time. Please set the cell phone on **silent/vibrate** mode.
6. All e-mail communication to the instructor must have the subject line start with [CS47].
7. **Email to be sent to the instructor's SJSU email ID (charles.bocage@sjsu.edu) only.**

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>"

CS 47, Introduction to Computer Systems, Section 2, Spring, 2017, Course Schedule

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Jan 30	Lecture: Introduction to CS47 / Introduction to Computer System Study
1	Feb 01	Lecture: Introduction to Computer
2	Feb 06	Lecture: Computer Organization, Homework I published
2	Feb 08	Lecture: Number Representation
3	Feb 13	Lecture: Programming a Computer
3	Feb 15	Lecture: Assembler / Linker / Loader
4	Feb 20	Lecture: SPIM Simulator
4	Feb 22	Lecture: Memory Usage I, Programming Assignment 01 due
5	Feb 27	Lecture: Memory Usage II, Programming Assignment 02 due
5	Mar 01	Lecture: MIPS Assembly Language I / Video Lecture 10, Programming Assignment 03 due
6	Mar 06	Lecture: MIPS Assembly Language II, Video Lecture 11
6	Mar 08	Lecture: Memory Alignment, Programming Assignment 04 due
7	Mar 13	Lecture: Procedure Call, Programming Assignment 05 due
7	Mar 15	Lecture: Study 'printf' procedure call, Programming Assignment 06 due
8	Mar 20	Midterm Review, Programming Assignment 07 due
8	Mar 22	Lecture: Logic Design Components, Homework I due
9	Mar 27	Spring Break:
9	Mar 29	Spring Break:
10	Apr 03	Midterm (Closed book)
10	Apr 05	Lecture: Boolean Algebra I
11	Apr 10	Lecture: Boolean Algebra II, Programming Assignment 08 due
11	Apr 12	Lecture: Logic Gates & Storage Element
12	Apr 17	Lecture: Logic Circuit Design
12	Apr 19	Lecture: Logic Design Components
13	Apr 24	Lecture: Addition Subtraction Logic
13	Apr 26	Lecture: Multiplication Logic
14	May 01	Lecture: Division Logic, Homework II dues
14	May 03	Lecture: Floating Point Representation

Week	Date	Topics, Readings, Assignments, Deadlines
15	May 08	Lecture: Exception & Interrupt
15	May 10	Final Review I, Project I due
16	May 15	Final Review II
Final Exam	May 22	Final (Closed book) – MacQuarrie Hall, Room 422, Time: 5:15pm – 7:30pm